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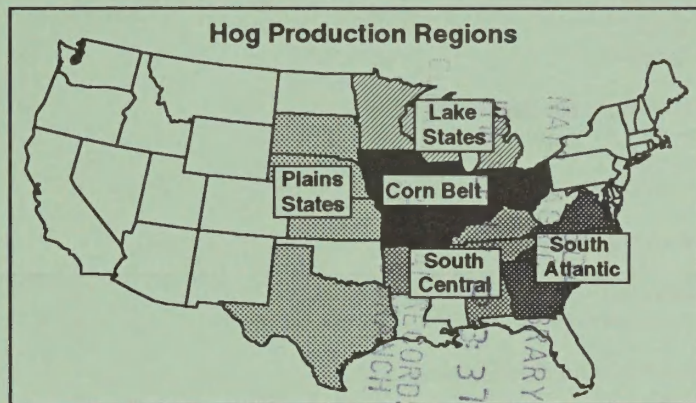
Manure Management by U.S. Pork Producers in 1992

- Manure pits were the most common manure storage facility used by U.S. hog producers in 1992. However, manure lagoons were more often used in the South Atlantic and South Central States, and on operations with a capacity of 2,500 hogs or more.
- Manure storage facilities on the largest hog operations were generally located farther from houses, wells, and surface water than those on smaller operations.
- Farms in the South Atlantic region had the highest average number of hogs sold per farm and the lowest average number of on farm acres to which manure was applied.

Basic statistics on hog production and manure management practices are available from the 1992 Farm Costs and Returns Survey of U.S. hog producers (see box on back page). In 1992, the Corn Belt had the largest share of hog farms and sales, while hog farms in the Plains States had the highest average acres operated (table 1). Although other areas accounted for a larger share of total hog production, hog farms in the South Atlantic States averaged larger in size, with almost 200 more head sold per year than in any other region.

The current trend in the hog industry is toward fewer but larger operations. This is a structural change in an industry that was once primarily made up of small operators. Nationwide in 1992, farms with a housing capacity of 1,000 hogs or more constituted only 17 percent of all hog operations but made up about 56 percent of total U.S. hog and pig sales (table 2). Farms with a production capacity of 2,500 or more hogs, only 3 percent of hog farms, accounted for a quarter of U.S. hog and pig sales. Over half of these largest farms were located in the Corn Belt and nearly one-fifth in the South Atlantic (fig. 1). Regionally, the South Atlantic States have increased production and concentration of large-scale hog operations more than the traditional hog-producing regions.

Impacts of large hog operations on the local environment have recently become a topic of public concern. Manure storage and treatment facilities along with land application rates help determine the potential environmental impacts. The Federal Water Pollution Control Act of 1972 requires the Environmental Protection Agency to regulate concentrated animal feeding operations through the



National Pollutant Discharge Elimination System (NPDES) permit program. One of the program requirements is for any farm with 2,500 or more confined hogs to have zero effluent discharge except in the event of a major storm. (Subsequent legislation has modified the original law and lowered the qualifying production capacity levels for NPDES in areas that are environmentally sensitive.)

Lagoons were the most common manure storage facility in the South Atlantic and South Central States and manure pits the most common storage facility in the Lake States, Corn Belt, and Plains States (see definitions on last page). As hog capacity increased, operators handled more manure in liquid form and utilized lagoon storage facilities, while smaller farms tended to handle manure in solid form and used manure pits for storage. Farms with 2,500 or more head production capacity handled most of their manure in liquid form using lagoon storage (table 2). As size of operation increased, so did the average distance between the manure storage facility and the nearest house, well, and surface water body (fig. 2).

Non-storage costs include custom manure-handling costs, odor control costs, and water pollution control costs. Smaller hog farms were less likely than larger farms to incur these non-storage costs. However, among hog farms that incurred non-storage costs, per unit costs averaged lower on the larger operations.

Contacts: David Shank (202) 219-0414 [dshank@econ.ag.gov] or William D. McBride (202) 501-8309 [wmcbride@econ.ag.gov]

About AREI UPDATES

AREI UPDATES is a periodic series that supplements and updates information in **Agricultural Resources and Environmental Indicators (AREI)**, USDA, ERS, AH-705, Dec. 1994. UPDATES report recent data from surveys of farm operators and others knowledgeable about changing agricultural resource use and conditions, with only minimal interpretation or analysis. Please contact the individual listed at the end of the text for additional information about the data in this UPDATE. If you would like to be added to the mailing list or have other questions about AREI UPDATES or AREI, contact Richard Magleby, (202) 219-0436. [rmagleby@econ.ag.gov]

Table 1—Manure management characteristics of pork producers by region, 1992.

Item	Lake States	Corn Belt	Plains States	South Atlantic	South Central	All Regions
Percent of farms	14	54	17	10	6	100
Percent of hog and pig sales	13	55	15	12	5	100
Average acres operated	418	492	935	449	398	548
Average acres manure spread on ¹	52	46	34	11	29	40
Number of head sold or removed:			Average number sold per farm/year			
All hogs	909	1,026	864	1,204	962	996
Feeder pigs	217	236	200	258	354	236
Market hogs	643	749	586	917	504	709
Manure handling:			Average percent of manure			
Solid form	40	36	34	2	5	31
Liquid form	58	59	59	89	84	64
Not handled	2	5	7	9	11	5
Farm manure storage facilities:			Percent of farms			
Lagoons	8	11	13	61	47	18
Manure pits	44	42	24	8	16	34
Manure holding tanks	9	8	5	1	1	6
Storage capacity:			Average number of months			
Lagoons	10	13	11	17	12	14
Manure pits	4	4	6	4	4	4
Manure holding tanks	4	4	3	1	5	4
Time of manure spreading:			Average percent of manure spread			
Jan, Feb, Mar	22	23	22	39	22	24
Apr, May, Jun	30	26	31	24	29	27
Jul, Aug, Sep	19	23	22	17	27	22
Oct, Nov, Dec	29	28	25	20	22	27
Farm production costs and returns:			Average cost or return (\$/cwt ²)			
Gross value of production (GVP)	\$48.11	\$47.83	\$51.40	\$47.05	\$51.87	\$48.50
Total cash costs	42.90	40.73	45.48	40.96	42.67	41.84
Total economic costs ³	60.03	56.98	61.89	56.52	61.88	58.28
GVP less cash costs	5.21	7.10	5.92	6.09	9.21	6.66
GVP less economic costs	-11.91	-9.15	-10.49	-9.47	-10.01	-9.78
Farms with non-storage control costs:			Percent of farms			
Custom manure handling	11	7	6	4	4	7
Manure odor control	8	6	3	5	9	6
Water pollution control	1	3	3	2	6	3
Non-storage control costs for farms reporting costs:			Average cost (\$/cwt ²)			
Custom manure handling	\$1.06	\$0.38	\$0.56	\$0.27	\$0.47	\$0.43
Manure odor control	0.14	0.13	0.18	0.10	0.09	0.13
Water pollution control	0.56	0.39	0.24	1.00	0.29	0.44
Location of closest storage facilities:			Average number of feet to			
Nearest occupied house	371	684	732	1,698	1,504	824
Nearest well	351	795	1,143	1,160	2,006	898
Nearest surface water	4,886	3,104	5,431	2,579	4,045	3,642
Location of lagoons:			Average number of feet to			
Nearest occupied house	550	1,593	1,094	1,771	1,511	1,510
Nearest well	473	1,168	1,162	1,199	2,057	1,264
Nearest surface water	3,261	2,462	5,431	2,610	4,150	3,190

¹Data only available for on farm spreading.

²Hundred weight of pork produced.

³Includes cash costs, capital replacement, and opportunity costs of owned inputs.

Source: USDA, Farm Costs and Returns Survey, 1992

Table 2—Manure management characteristics of pork producers by production capacity, 1992.

Item	Capacity of housing facilities ¹			
	Less than 500	500-999	1,000-2,499	2,500 or more
Percent of farms	60	23	14	3
Percent of hog and pig sales	23	21	31	25
Average acres operated	466	659	692	681
Average on-farm acres manure spread on	20	51	94	115
Number of head sold or removed:		Average number sold per farm/year		
All hogs	375	936	2,139	8,628
Feeder pigs	98	119	343	3,467
Market hogs	266	778	1,691	4,464
Manure handling:		Average percent of manure		
Solid form	61	42	20	9
Liquid form	28	50	76	90
Not handled	11	8	4	1
Farm manure storage facilities:		Percent of farms		
Lagoons	12	20	27	65
Manure pits	20	47	71	52
Manure holding tanks	5	8	9	5
Storage capacity:		Average number of months		
Lagoons	18	8	15	9
Manure pits	5	4	4	3
Manure holding tanks	4	3	5	4
Time of manure spreading:		Average percent of manure spread		
Jan, Feb, Mar	25	26	23	23
Apr, May, Jun	28	27	27	26
Jul, Aug, Sep	21	21	22	24
Oct, Nov, Dec	26	26	28	27
Farm production costs and returns:		Average cost or return (\$/cwt ²)		
Gross value of production (GVP)	\$48.92	\$47.42	\$46.83	\$51.84
Total cash costs	46.26	40.01	39.36	43.38
Total economic costs	71.58	57.25	53.15	54.49
GVP Less cash costs	2.67	7.41	7.47	8.45
GVP Less economic costs	-22.65	-9.84	-6.33	-2.65
Farms with non-storage control costs:		Percent of farms		
Custom manure handling	4	9	15	27
Manure odor control	3	7	15	24
Water pollution control	0	4	8	13
Non-storage control costs for farms reporting costs:		Average cost (\$/cwt ²)		
Custom manure handling	\$0.69	\$0.50	\$0.37	\$0.41
Manure odor control	0.26	0.21	0.14	0.09
Water pollution control	NA	0.91	0.36	0.29
Location of closest storage facility:		Average number of feet to		
Nearest occupied house	856	755	770	1,200
Nearest well	820	805	826	2,274
Nearest surface water	3,342	3,490	4,102	4,670
Location of lagoons:		Average number of feet to		
Nearest occupied house	1,244	1,386	1,344	3,191
Nearest well	880	1,408	1,007	2,948
Nearest surface water	2,313	3,400	4,203	3,995

¹Capacity is measured by each farm's peak hog inventory during 1992.²Hundred weight of pork produced.

Source: USDA, Farm Costs and Returns Survey, 1992

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Figure 1
Percent of all surveyed farms with a housing capacity of 2,500 or more hogs

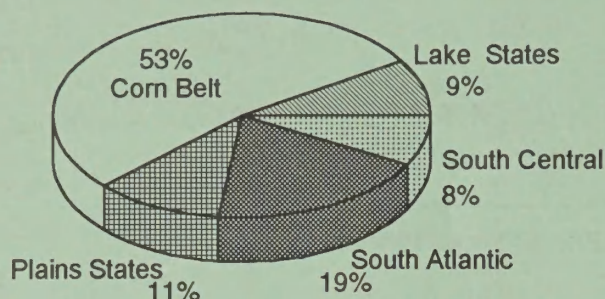
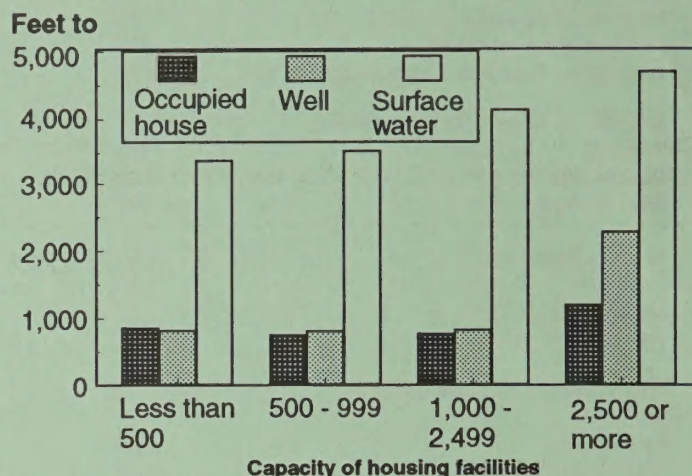


Figure 2
Distance from any storage facility to the nearest occupied house, well or surface water



Definitions

Lagoon - Lagoon storage systems are designed to store animal waste, flushed out of the housing facility with water. This system offers a quick and easy way to clean out housing facilities. However, because of the large amount of water added to the effluent, liquid systems require larger facilities to store the effluent between spreadings.

Manure holding pit - Housing facilities using this system typically use a slatted floor with a pit below. The manure is pushed into the pit by the animals walking on it and is held there until spreading. Manure pits and tanks are considered slurry systems because only small amounts of liquid are added.

Manure holding tank - These systems are an alternative to the holding pit and offer improved air quality in the confinement house. The collected manure is stored in a tank that can be above ground or below ground and is usually located near the housing facility. The tanks can be closed or open and are typically constructed from concrete, glass fused metal, or dirt.

Custom handling costs - This includes any contract or custom costs in 1992 paid for manure handling.

Water pollution control costs - Expenses in 1992 to control or avoid water pollution; includes fees, permits, and licenses.

Odor control costs - This includes any expenditures to reduce manure odor.

Farm Costs and Returns Survey (FCRS)

FCRS is an annual survey conducted by USDA's Economic Research Service and the National Agricultural Statistics Service. The survey uses multiple versions to obtain detailed information on farm costs and returns, and on commodity costs of production. While whole-farm information is gathered annually, commodity information is gathered every 4-5 years on a rotating basis. Data in this report are from the hog version of the 1992 FCRS. The 1,221 respondents to the 1992 hog version expand to represent 94 percent of U.S. hog and pig sales. For more information, see "U.S. Hog Production Costs and Returns, 1992: An Economic Basebook." AER#724 USDA/ERS.

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Natural Resources and Environment Division
1301 New York Ave., NW., Rm. 524
Washington, DC 20005-4788

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